4 pts

MAGNETIC MOUNT AND METHOD FOR SECURING A MAGNET TO A CARRIER ELEMENT

Related Art

Background of the Invention

The invention is based on a magnet mount and a method for securing a magnet to a carrier element according to the general class of Claim 1 and Claims 12, 13.

It is already known from JP-08336273 that magnets are secured to a carrier ring by way of a restraining element. The restraining element is not a single piece with the carrier ring, however, and must be screwed tightly into place on the carrier ring using two screws for each magnet.

Summary of the Invention

Advantages of the Invention

In contrast, the magnet mount according to the invention and the method according to the invention for securing a magnet to a carrier element having the characteristics and features of Claim 1 and Claims 12, 13 have the advantage that magnets can be secured to a carrier element in simple fashion.

Advantageous further developments and improvements of the device named in Claim 1 are possible using the measures listed in the dependent claims.

It is advantageous to design the restraining element as a projection protruding from of the carrier element, because a simple and cost-effective restraining element can then be produced as a result.

It is also advantageous to produce the carrier element out of sheet-metal laminate, because the restraining element can then be stamped easily, quickly, and cost-effectively out of a sheet-metal panel.

Furthermore, it is advantageous when the magnet has at least one notch in which the restraining element can grip, because an outer radius of the magnet and carrier element is not increased as a result.

An advantageous design of the carrier element has a disc-shaped cross section.

A further advantageous design of the carrier element has a ring-shaped cross section.

The magnet can be secured to the carrier element in advantageous fashion in that the magnet is placed on the carrier element and the restraining element is then deformed so that the magnet is is held in place on the carrier element by way of positive engagement and adherence, so that a simple, quick, and cost-effective magnet securing method is achieved.

Another advantageous method for securing the magnet to the carrier element is to bend the restraining element by action of force so that the magnet can be situated on the carrier element, and the action of force is then removed, so that the restraining element then grips the magnet, so that a simple, quick, and cost-effective magnet securing method is achieved.

b Brief Description of the Drawings

Diagram

Design examples of the invention are shown in simplified form in the diagram, and they are described in greater detail in the description below.

Figure 1 shows a first embodiment of a magnet mount designed according to the invention, Figure 2 shows a radial cross section of Figure 1, Figure 3 shows a further embodiment of a magnet mount designed according to the invention, and Figure 4 a through c show magnets for a magnet mount.

Description of the Embodiments

Figure 1 shows a magnet mount 1 and Figure 2 shows a radial cross section of Figure 1.

Four magnets 8, for example, are arranged on the carrier element 5 of the magnet mount 1.

In this example, a magnet 8 is secured by way of four restraining elements 14 to a carrier element 5 that are designed as a single piece with the carrier element 5 and can be plastically or elastically deformed. The restraining elements 14 are designed in the shape of a hook, for example.

A magnet 8 has four notches 16, for example, in which the restraining elements 14 grip, in order to secure the magnet 8 to the carrier element 5.

The restraining elements 14 have the shape shown in Figure 2 and are bent upward so that the magnet 8 can be installed. Instead of the magnet 8, other parts, such as a mirror for a light barrier, can also be secured to the carrier element 5.

The carrier element 5 can have a disc-shaped structure in the radial cross section or, as shown in Figures 1 and 2, it can have a ring-shaped structure. The carrier element 5 is thereby designed—as shown in Figure 1, for example—so that it can be installed on a shaft 20.

Cross ribs connect an outer ring with an inner ring. The shaft 20 and the carrier element 5 have a center line 21. Such a magnet holder is not only suited to holding magnets on an outer circumferential surface 18 of the carrier element 5, but also on an inner circumferential surface. Such a magnet mount 1 is installed in an electric motor, for example, where it forms a rotor, for instance.

The restraining elements 14 do not extend over the outer limit of a magnet 8, for example. This is particularly important when the rotor is to comprise particularly small air gaps within a stator of an electric motor. A recess 23 is provided in the mounting area of the magnet 8 on the carrier element 5 in which the magnet 8 is then located.

Figure 3 shows a carrier element 5 without magnets 8. The restraining elements 14 are not bent, and they form projections 27 protruding from the circumferential surface 23 and pointing away from the center line 21.

Figures 4 a through c show embodiments of magnets 8 for a magnet mount 1.

The magnets 8 are ring arc segments, for example, having the same thickness, for instance, that are quadrangular in shape, for example, as seen in a top view of the surface having the notches 16.

Two notches 16 each, for example, are then located on the surface of the magnet 8—which then has a convex curvature—along the two edges extending in a straight line on the surface with the convex curvature (Figures 4a, 4b). In the embodiment shown in Figure 4a, the surface of the magnet 8 is uninterrupted as it changes into the notch 16.

Figure 4b shows a second embodiment of such a magnet 8. In contrast to Figure 4a, a uniform graduation from the surface of the magnet 8 is provided along the notch 16.

Figure 4c shows a magnet that has just one notch 16 on one edge which is designed to be wider than a notch 16 as shown in Figures 4a, b, so that a correspondingly wider restraining element 14 that applies sufficient restraining force can catch on a greater gripping surface.

The carrier element 5 can also be a laminated core formed out of individual sheet-metal laminates. During manufacture of a sheet-metal laminate using a stamping tool, sheet-metal laminates are produced without projection 27 and with projection 27.

The different sheet-metal laminates are stacked and bundled accordingly.

The securing of magnets 8 to the carrier element 5 can be carried out in many fashions.

The magnets 8 are introduced into the recess 23, and the projections 27 are then pressed into the notches 16 of the magnets 8. The projections 27 are thereby designed so that, after they are bent into the notch using an appropriate stamp, they lie on the surface of the magnet 8 in positive fashion and no longer protrude above its surface. The notch 16 in the magnet 8 and the shape of the restraining element 14 (length, width, bending), are designed and adapted so that the restraining element 14 and the notch 16 reliably withstand the stresses produced during operation, via rotation, for example.

A further method for securing the magnet 8 to the carrier element 8 can require that the projections 27 be bent (Figure 2), then the magnet 8 is introduced into the recess, and then, by removing the action of force on the projections 27, the projections come to rest in the notch 16 of the magnet 8 by way of positive engagement and adherence.

Potential magnets are those, for example, that have been manufactured via hot extrusion, for instance, i.e., the notches can be applied directly in the manufacturing process, and they do not need to be created subsequently, e.g., via grinding.